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ABSTRACT

An instructional unit, "Coping in the World of Work: Practice in Problem Solving," designed to assist 11th and 12th grade high school students in developing the ability to solve vocational adjustment problems was developed and evaluated. Instructional goals of the unit included the following: (1) To become acquainted with the range of job adjustment problems typically encountered in the world of work, (2) to learn a five-step problem solving approach for solving job adjustment problems, (3) to learn to apply the approach with real life simulated practice problems, and (4) to learn to use the approach with real problems outside the classroom. The five problem solving steps are diagnosing or defining the problem, generating alternative solutions, evaluating the solutions in terms of feasibility and usefulness, choosing a solution and implementing it, and validating that the solution accomplished its ends. Teaching methods such as filmstrips, case studies, role playing, brainstorming, group discussions, and individualized instruction were used. Pilot and field testing were conducted using two forms of assessment instruments based on the stated behavioral objectives. Gains registered by the experimental group were substantial whereas essentially no gains were registered by the control group. It was concluded from the pilot and field testing that the instructional unit helped students become acquainted with a range of work entry and job adjustment problems and learn a systematative five-step approach to cope with these problems. In addition, all instructors teaching the unit reported positive experiences with the unit and its content. (TA)

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THE DEVELOPMENT OF AN INNOVATIVE STRATEGY FOR COPING WITH THE TRANSITION FROM SCHOOL TO WORK: IMPLICATIONS FOR HIGH SCHOOL STUDENTS*

by

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Introduction and Theoretical Framework

Several years ago The Center for Vocational Education initiated a programmatic effort to alleviate the non-technical problems that youth experience in their transition from school to work. The initial series of studies were descriptive in that they were designed primarily to identify worker adjustment problems of youth, but not necessarily to correct them (Garbin, Campbell, Jackson, and Feldman, 1967; Garbin, Jackson, and Campbell, 1967; Eggeman, Campbell, and Garbin, 1969; Stogdill and Bailey, 1969; and Garbin, Salomone, Jackson, and Ballweg, 1970). These descriptive studies surveyed worker adjustment problems as reported by vocational education teachers in cooperative programs, Youth Opportunity Center counselors, and young workers on the job.

The problems were initially classified into two major categories (1) On-the-job performance problems and (2) Job entry, career planning and management problems. On-the-job performance problems were defined as those problems which interfere with the worker's successful performance of the tasks of a job. These are subcategorized into two groups (a) technical and (b) non-technical problems which include difficulties in human relations, social skills, decorum, appearance, role conflicts, work habits, etc. Job entry, career planning and management problems were defined as those which involve the individual's entrance, retention and advancement in the world of work and typically include job seeking, occupational mobility, job layoffs, and geographic mobility. However, for ease of retention by the students, these categories were further refined into four areas: on the job adjustment problems, off the job adjustment problems, personal and family situational adjustment problems, and the problems related to planning and training for a career.

Another objective of this part of the study was to identify a high priority coping problem and an intervention strategy which could be developed to impact upon the problem. A coping problem and intervention strategy was identified which fulfilled multiple criteria such as: (1) they have high visibility and durability in terms of the pervasiveness of the problem; (2) they are manageable within the constraints of component staff and funding; (3) they have probability of eventual consumer acceptance, i.e., viable for potential implementation by high schools; (4) they are manageable for consumers, e.g., cost, complexity, and personnel requirements; and (5) they represent a prototypic first step of a larger thrust to deal with the vocational coping problems of youth. The six highest ranked problems that met these criteria were identified as follows:

Peer and Supervisory Adjustment

Coping with Automation and Changing Technology On the Job

Coping with the Organizational Work Climate (Varied Settings)

Occupational Mobility

Job Seeking Skills

Work Habits

Peer and supervisory adjustment was ranked first since it best met the multiple criteria. This choice was further substantiated by a number of recent studies which documented the pervasiveness of the problem (Garbin, et al., 1970; Stogdill and Bailey, 1970; and the Michigan Survey Research Center National Survey of Working Conditions, 1970). For example, the Michigan Survey reported that the "quality of relations with one's supervisors was among the variables most highly correlated with worker's job satisfaction" (p. 322), and "the quality of a worker's relations with his

supervisor had a substantial impact upon his job satisfaction and mental health" (p. 318).

It was further recommended that as to the choice of an intervention strategy, the use of the case study problem solving approach would be most effective as an instructional methodology since it met the multiple criteria mentioned above and it is seen as a promising educational innovation to facilitate coping in naturalistic settings such as the job setting.

Although there has been a considerable amount of research on cognitive problem solving, it has been sporadic and primarily confined to laboratory task problem solving as contrasted with "real life" situational problems (Kleinmuntz, 1966). But if any headway is to be made on assisting individuals to improve their coping skills, pioneer efforts will have to be initiated in real life problem solving. A conference on "Coping and Adaptation" at Stanford University (Hamburg and Coelho, 1969) strongly recommended more naturalistic, ecological, real life research on coping. In this same conference, Lazarus, one of the leading authorities on coping, redefined coping as problem solving efforts made by an individual when the demands he faces are highly relevant to his welfare (i.e., a situation of considerable jeopardy or promise), and when these demands tax his adaptive resources.

D'Zurilla and Goldfried (1971) define human problem solving as "a behavioral process, whether overt or cognitive in nature which (a) makes available a variety of potentially effective response alternatives for dealing with the problematic situation and (b) increases the probability of selecting the most effective response from among these various alternatives."

Lazarus, Mechanic (1969), D'Zurilla and Goldfried (1971) and the authors agree that the most promising intervention strategy for improving

individual coping is the development of learning units which are designed to teach individuals the process of real life problem solving. This recommendation has been further reinforced by a recent national Gallup poll of Public Attitudes Toward Education (Phi Delta Kappan, 1972) in which respondents were asked to rank nine specific programs for reaching educational goals. The respondents ranked problem solving among the top as follows:

Rank 2: "Teaching students how to solve problems and think for themselves."

Rank 3: "Teaching students vocational skills."

Rank 4: "Teaching students how to get along with others."

As a result of this exploratory research, the present instructional unit was developed to assist high school instructors in achieving the following instructional goals with their students: (1) to become acquainted with the range of job adjustment problems that people typically encounter in the world of work; (2) to learn a five step problem-solving approach for solving job adjustment problems; (3) to learn to apply the problem-solving approach with real life simulated practice problems; and (4) to learn to use the problem-solving approach with real problems outside the classroom.

The instructional unit involves a five-step problem solving approach: (1) diagnosing or defining the problem; (2) generating alternative solutions; (3) evaluating the solutions in terms of feasibility and usefulness; (4) choosing a solution and implementing it; and (5) validating that the solution accomplished its ends.

II. Instructional Unit: A Description

The primary purpose of the instructional unit "Coping in the World of Work: Practice in Problem Solving" is to help each individual develop his

or her own confidence and ability to solve vocational adjustment problems. In order to achieve this, the unit was developed around the four instructional goals referred to earlier.

Given these four major goals, the five step problem solving approach was further broken down into instructional sub-steps, with each one designed to acheive one or more student behavioral objectives.

Since the instructional goals of the unit are very general, a form of behavioral objectives was developed called criterion objectives which provide a way of specifying the skills, knowledge, and attitudes a student must have to achieve the goals. Behavioral or enabling objectives were derived from these criterion objectives and provide a method for assessing the accomplishment of the actual tasks involved in achieving the instructional goals of the unit.

Acquainting students with the range of work entry and job adjustment problems was achieved by testing the two behavioral objectives shown below:

At the conclusion of the coping unit, students will:

1. Select the four major categories of work entry and job adjustment problems;

2. Select five of the twenty work-entry and job adjustment problem categories.

Teaching students a systematic, five-step approach to deal with these problems was achieved by testing the following behavioral objectives.

At the conclusion of the coping unit, students will:

1. Distinguish between a potential problem, a fully developed problem and a no problem situation. This will be accomplished by reviewing three case studies and checking off the correct responses.

2. Describe the value of early detection of a problem as enabling one to deal with a potential instead of a fully developed problem.

3. Distinguish between those elements of a case study that are either causes or symptoms of a problem or both.

4. List the two general sources of information for work entry and job adjustment problem identification.

5. Categorize at least two sources of information from a given case study in terms of rating the accessibility and value of the source for problem identification.

6. Generate at least two possible solutions to a given work entry or job adjustment problem.

7. Select at least one appropriate criterion for a solution to a work entry or job adjustment problem.

8. Identify the purpose of generating solutions to a work entry or job adjustment problem.

9. Identify the two considerations for seeking sources of information for solution evaluation.

10. Identify the two considerations necessary in choosing a solution to a given problem.

11. Determine the workability and usefulness of at least two solutions to a work entry or job adjustment problem in a given case study.

12. Select from a list, the reason information is sought after problem solutions have been generated.

13. Select from a list, the reason for recycling a problem.

14. Determine whether or not a given solution to a given case study has successfully met its criterion and, if not, to where the problem should be recycled.

All of the above behavioral objectives represent the direct result of previous research and development efforts by the project staff. In addition, each objective was further refined by external consultants who were specifically employed to relate each behavioral objective to the goals of the unit.

In order to acheive maximum individual development the instructional unit was developed using a number of different types of teaching methods.

These various approaches include but are not limited to: (1) filmstrips designed to give the students a visual perception of how the five-step problem solving approach could be applied in an actual job situation along with definitions of selected types of job adjustment problems; (2) case studies that depict different employees facing real life job adjustment problems that the students can relate to in terms of age, types of jobs, etc.; (3) role-playing exercises that involve students in situations that are similar to the real world in which they will be required to work and communicate with their peers; (4) brainstorming exercises that are designed to allow all students (especially those students who might not be highly verbal) to express their ideas freely without fear of criticism; (the rationle for including this particular type of exercise was based on the need for young workers to express themselves in today's highly competitive world of work); (5) group discussions to enable the young worker to appreciate the need for working together in small groups to solve job related problems; and (6) individualized instructional exercises to increase the student's self-confidence by achieving a successful solution to the given problem. The above methods and their implicit instructional intents are but a few of the possible approaches that the instructor can use in this unit.

The unit materials consist of thirty student guides, transparency and handout masters, two introductory filmstrips with accompanying cassette tapes, and one instructor's handbook. The instructor's handbook contains detailed lesson plans that encourage input from instructors and students, as well as copies of all handout and student guide materials. Since masters of

all consumable products are provided to insure reusability, the cost per student is minimal.

Further, it is intended that individual components of the unit be available for purchase on a cost recovery basis. The unit is self-instructional for the instructor and requires fifteen to twenty-five hours of preparation by the instructor prior to classroom implementation, for the purpose of reviewing materials and organizing schedules. Instructors may be regular classroom teachers or guidance counselors. The unit may be taught to a group of from six to thirty students. It is designed to use eleven forty to fifty-five minute class periods, but can be extended to four weeks or longer with the use of supplementary materials that are provided and/or those that are recommended. The target audience for this unit is eleventh and twelfth grade students in high school, especially those who plan to work either part-time or full-time after graduation.

III. Evidence of Effectiveness

Evidence of effectiveness will be presented in Section B - Field Test. The description of the pilot test is provided first to permit the reader to fully evaluate the quality of the instrumentation and the experimental design.

A. Pilot test

The purposes of the pilot test were to: (1) perform preliminary testing of the goals of the unit (stated earlier); (2) check the statistical and analytical procedures to be used in the field test; and (3) reduce the number of treatment errors by redesigning the field test, if necessary. A pretest/posttest control group quasi-experimental design utilizing intact classes was used to assess the effectiveness of the instructional unit.

1. Instrumentation

The behavioral objectives listed earlier were used to develop a pool of possible questions to be used on the two forms of the assessment instruments. From this pool of questions and based on an item analysis, 16 were selected for the pretest and the same number for the posttest. Each objective was given equal weight in testing. For ease of scoring, the final item on each test was split into two parts (i.e., each test contained 17 items). Each item on either form of the test related to one, and only one, behavioral objective. The tests were designed to be parallel, i.e., item 1 on Form A used the same stems, format, number of words, and so forth as item 1 of Form B. This procedure was followed with all items. Both the tests and the behavioral objectives were analyzed, synthesized, and refined with the help of Ivan Horabin, a specialist in criterion-referenced testing and past Executive Director of the National Society for Performance Instruction.

All other questions were either multiple-choice or fill-in-the-blank type. Each response was scored +1 if it was correct, -1 if it was incorrect, zero if it was blank. Scores for each item (each item consisting of a different number of possible responses) were then standardized within a range of 0 to +1. Each of these scores were then summed over the entire test, producing a range of 0 to 17 for each student. This standardization procedure eliminated the response variability between items which were due to differences in the range.

2. Experimental Design and Results

The pilot test subjects were students at a local joint area vocational school in Columbus, Ohio. The unit, pretests, and posttests were administered during December, 1975 and January, 1976 to one experimental group and one control group of students. Since it was not possible to disrupt class schedules to randomize assignment procedures, intact classes were used. In order to minimize effects of non-random assignment, each group of students was selected by the instrutor to be roughly equivalent in terms of male/female ratio, age (17-18 years old), grade level (eleventh and twelfth grade), and general academic ability. The same instructor taught both groups of students. The experimental procedure followed in the school was as follows:

a. Both experimental and control groups received the pretest (Form A).

b. The experimental group received the instructional unit while the control group continued with standard classroom activities.

c. Both groups received the posttest (Form B).

d. One month later, the experimental group was randomly split in half with one half receiving Form A of the test while the other half received Form B on the first day.

e. The second day, the half of the experimental group receiving Form A on the first day received Form B while the half receiving Form B on the first day received Form A.

This design was used to: (1) determine the reliability and parallelness of the two forms of the tests; and (2) assess the effects of the in-

structional unit. Since two different representative samples of items were used, a coefficient of equivalence (or alternate forms) is the most desirable reliability coefficient (Issas and Michael, 1971). The coefficient of equivalency across subjects for Forms A and B was high (r = .725), indicating the two forms are reliable. The correlation between Forms A and B across items was also high (r = .914) suggesting the forms are parallel. These correlations were obtained from the second administration of the posttest with the experimental group (N = 13). Since these results suggested reliable, parallel forms, an analysis of gain scores was conducted (see Table 1).

TABLE 1

Standardized Mean Gain Scores for Pilot Test
(Range: 0 to 1)

Group	Pretest (Form A)		Posttest (1) (Form B)		Gain	
	M	SD	M	SD	M	SD
Experimental (N=13)	0.51	0.036	0.66	0.095	0.15	0.088
Control (N = 14)	0.50	0.069	0.51	0.052	0.01	0.045

From pretest to posttest, the experimental group showed a 29.4 percent gain obtained by dividing the mean gain by the mean pretest score. Over the same length of time, the control group showed a gain of only two percent. An analysis of variance was performed to determine whether or not the gains were significant.

TABLE 2

Analysis of Variance for Experimental/Control Group Differences in Pilot Test (N=27)

Measure	Source	df	MS	F
Pretest	Between groups	1	0.071	0.772
	Within groups	26	0.066	
Posttest	Between groups	1	0.154	26.19*
	Within groups	26	0.117	

Since there were no significant differences between the experimental and control group on the pretest (see Table 2) this suggests that both groups were approximately equivalent in their initial abilities to achieve the behavioral objectives as measured by the pretest. There are, however, significant differences on the posttest between the two groups (see Tables 1 and 2). Note that the experimental group showed a significant learning increment in their abilities to achieve the objectives during the instruction.

B. Field Test

Five secondary schools were selected for the field test: Parkway West Senior High School and Normandy High School in St. Louis, Central High School in Flat River, Missouri, and Coon Rapids High School and Stillwater High School in the Minneapolis/St. Paul, Minnesota area. These schools were selected because of the socio-economic range (as determined by the administration and staff of each school) they represent: one school was inner-city, one upper class suburban, one rural mining town, and two rural blue collar schools.

Four schools provided two experimental and two control classes each. Students were from the eleventh and twelfth grades, ranging in age from 17 to 19 and were equally distributed by sex. All had had some type of work experience, either part-time or full-time, and all planned either additional schooling and/or work upon graduation.

To assess the effectiveness of the instructional unit, a pretest/posttest control group quasi-experimental design with intact classes was used. The same two forms of the criterion-referenced test were used that were used in the pilot test. Form A was administered as a pretest to both the experimental and the control groups on the same day. Form B was administered similarly as a posttest.

To assess the impact of any initial differences between experimental and control groups, demographic information was collected. The independent variables (as indicated in the formative product engineering phase of this study) which might affect performance differences were of three types:

(1) personal background information - age, sex, father's occupation,[1] father's education, mother's occupation,[1] and mother's education

(2) educational information - type of school program (e.g., college preparatory), grade point average (GPA), school activities (e.g., athletics, drama club), intentions after graduating (e.g., more school, work), and grade level

[1]Note that the transformation of the father's and mother's occupation variable to ordinal data was achieved by averaging occupations within each of the eleven Socioeconomic Index (SEI) classes constructed by Duncan (1961). The mean of the Socioeconomic Index for each class was then computed. SEI classes were ranked according to the value of the mean.

(3) work-related information - amount of part-time work experience, exposure to problem solving techniques (i.e., whether or not in the student's opinion they had been exposed), and the type of exposure to problem solving techniques.

A one-way analysis of variance was used crossing all 17 independent variables with the experimental/control variable. The experimental group showed a statistically significant difference with respect to the control groups on only one of the 17 variables: exposure to problem solving techniques prior to the treatment (see Table 3).

TABLE 3

One-Way Analysis of Variance for Exposure to Problem Solving Techniques

Group	M	SD	Source	df	MS	F
Experimental (N = 193)	1.72	.45	Between groups	1	1.014	5.800*
Control (N = 187)	1.82	.38	Within groups	378	.175	

A chi-square analysis was also performed on the frequencies of Yes-No responses to the question of whether or not a student had had exposure to problem solving techniques. This was done to determine whether the observed frequencies in the sample deviated significantly from the theoretical or expected population frequencies. The analysis yielded $\chi^2 = 5.17319$ ($p < .05$). The chi-square and analysis of variance, although statistically significant, were not educationally significant for the following reasons:

* $p < .016$

(1) The "exposure" variable did not correlate with any of the dependent variables (e.g., gain scores, pretest scores, posttest scores).

(2) When the "exposure" variable was used in an analysis of covariance, it was not found to be useful as a predictor of adjusted posttest scores (scores adjusted for pretest and GPA).

(3) Only 5.5% of the students in the experimental group who indicated they had had exposure to problem solving techniques were able to identify them (e.g., school courses, on-the-job training).

(4) Of this group, more than 75% (or 4.125% of the 5.5%) indicated that the type of exposure they had to problem solving techniques was skill-related (e.g., how to determine a malfunction in an electronic circuit) rather than a problem solving behavior related to psychological job adjustment.

(5) The experimental group had only 5.4% more students than the control group who indicated they had had some exposure to problem solving techniques.

Based upon the analysis of this variable and the pretest score variable, the experimental and control groups appeared to be equivalent notwithstanding the "exposure" variable discussed above.

The next part of the analysis deals with posttest and gain scores. All raw scores were transformed to insure a range of 0 to 1 as in the pilot test. This tranformation was performed to decrease response variability due to differences in the range for each item. As shown in Table 4, the standardized scores showed an adequate learning increment for the experimental group over the control group. The experimental group showed a 20.6 percent average gain from pretest to posttest while the control group showed a gain of 0.5 percent over the same time.

TABLE 4

Gain Scores for Field Test

Group	Pretest		Posttest		Gain	
	M	SD	M	SD	M	SD
Experimental (N = 216)	0.592	0.061	0.714	0.105	0.122	0.098
Control (N = 200)	0.588	0.068	0.591	0.074	0.003	0.068

A one way-analysis of variance between experimental and control groups on pretest scores showed no significant differences. An analysis of variance on the posttest scores showed a significant difference between the groups (see Table 5). These findings suggest that both groups were approximately equivalent in their initial ability to achieve the behavioral objectives as measured by the pretest. The experimental group, however, showed a significant increase in their abilities to achieve the behavioral objectives as measured by the posttest.

TABLE 5

One-Way Analysis of Variance on Pretest and Posttest Scores

Measure	Group	M	SD	Source	df	MS	F
Pretest	Exp (N=216)	.592	.061	Between groups	1	0.32	0.26
	Con (N-200)	.588	.068	Within groups	414	1.20	
Posttest	Exp (N=216)	.714	.105	Between groups	1	450.74	186.36*
	Con (N=200)	.591	.074	Within groups	414	2.43	

To determine whether or not the gain (dependent variable) was due to the treatment, an analysis of covariance was performed using grade point average

*$p < .001$

(GPA) and pretest scores as covariates. The total proportion of the variance accounted for was 53%. The adjusted posttest means were: 0.72 for the experimental group, and 0.59 for the control group, a difference of 0.13. Although including GPA and pretest scores increased the posttest score differences slightly (unadjusted mean difference = 0.12, adjusted mean difference = 0.13), they are essentially the same as the unadjusted mean differences, indicating that the gain was due to the treatment.

An analysis of covariance of the independent variables (GPA, pretest scores, treatment) that correlated significantly with the posttest scores was performed. The purpose of the analysis was twofold: first, to determine whether or not there were intergroup differences on any of the independent variables which when controlled for, would diminish the effects of the treatment variable; and, second, to decrease the error sum of squares. Table 6 provides a summary of the major findings. Note that the treatment remains highly significant even when the effects of the other variables are controlled. The GPA and pretest score variables are also significant, but age, father's occupation, and sex are not. These latter three variables were, therefore, dropped from further analysis.

TABLE 6

Analysis of Covariance for Posttest Scores with Significantly Correlated Independent Variables (N=416)

	Sum of Squares	df	MS	F
Age	2.197	1	2.197	1.498
Sex	1.707	1	1.707	1.164
Father's Occupation	1.277	1	1.277	0.871
GPA	81.962	1	81.962	55.887*
Pretest	57.005	1	57.005	38.870*
Main effects (treatment)	317.226	1	317.226	216.307*

* $p \leq .001$

To obtain numerical estimates of the magnitude of effects of the treatment, GPA, and pretest score variables, a regression analysis to predict posttest scores was run. The best prediction of posttest scores was obtained from the relation shown in Equation 1(A).

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \qquad \text{Eq. 1A}$$

or

$$Y = 4.4 + .54 X_1 + .21 X_2 + .31 X_3 \qquad \text{Eq. 1B}$$

where

Y = Posttest scores
β_0 = Intercept
$\beta_{1,2,3}$ = Weighting factors
X_1 = Treatment variable
X_2 = Grade point average variable
X_3 = Pretest score variable

Note that the partial β_1(=.54) associated with the treatment variable is nearly as large as the bivariate r (=.55) between the treatment and gain scores variable. This indicated the gains associated with the treatment are not due to differing composition of the groups with respect to these covariates (CPA, pretest scores). Also, note that the numerical estimates of the magnitude of the effects of the GPA and pretest score variables (.21 and .31, respectively) are substantially smaller than the treatment effect (.54). The addition of GPA and pretest scores do, however, improve the statistical fit of the model: r^2 = .29 versus R^2 = .51. (In this discussion, r^2 is the two-variable r-square between the treatment variable and the posttest. R^2 is the multiple R-square including the treatment, GPA, and pretest variables as predictors of the posttest scores.)

In sum, this analysis implies that although the effects of GPA and pre-test scores were significant, the effect of the treatment variable on post-test scores was not appreciably diminished.

A one-tailed *t*-test was performed on the gain scores by item (17 total items on each test) between the experimental and control groups). Fifteen of these tests were significant: 13 at the .01 level and two at the .05 level.

The two test items that did not discriminate adequately were related to objectives 11 and 14 (see page 6). The test item relating to Objective 11 consisted of a scale concerning the workability and usefulness of solutions to a given problem. The page preceeding this item on the test contained a similarly scaled question relating to the accessibility and value of sources of information for problem solution (Objective 5). This suggests that: (1) the unit made no difference in teaching how to assess the workability and usefulness of problem solutions; (2) the results were due to chance; or (3) the control group was able to learn something about responding to the second test item (Objective 11) by responding to the preceeding item (Objective 5).

The test item related to Objective 14 involved two parts: (1) a yes/no dichotomy concerning whether or not a given solution to a given case study had successfully met its criterion; and (2) if no, to where the problem should be recycled. The *t*-test related to the first part showed no significance; the *t*-test related to the second part was significant. This suggests that: (1) the unit made no difference in teaching whether or not a given solution had met its criterion; or (2) the results were due to chance. Overall, however, the experimental group was able to show a significant gain over the control group in achieving 88.2% of the behavioral

objectives as measured by posttest scores.

Since covariance analysis assuming linear, additive effects of covariates was used in making these determinations, a test of the additivity assumption was conducted. A regression equation was calculated where gain scores were predicted by variables X_1, X_2, X_3 and interaction terms between variables X_1, and X_2, and variables X_1, and X_3 (see Equation 1). These interaction terms were added to the model to see if predictive ability would increase. Results showed the increase in R^2 by including interaction terms was .00214. This increase was not statistically significant ($F = 0.76$, $p < .5$). It may be concluded that: (1) the interaction terms are not necessary; (2) analysis of covariance with experimental/control variable as the dependent variable, and GPA and pretest scores as the covariates provides a satisfactory representation of the relationships in the data; and, (3) most importantly, the check for interaction implies that the unit works as well for students with low GPA's as it does for students with high GPA's.

After the administration of the posttest, the eight instructors who taught the eleven experimental classes were asked to respond to a questionnaire consisting of a combination of open-ended and objective questions about the unit and its delivery. All eight instructors responded and each stated that the unit was self-instructional for the instructor.

Seven of the eight instructors responding felt that: (1) the instructor and student directions are clearly written; (2) all necessary materials for implementing the course are either included, or readily available; (3) the time frames are feasible for student activities; (4) the instruction proceeds in a logical and systematic order; and (5) the materials are

clearly written. Six of the eight instructors responding felt that the format of the instructional package was effective for attaining the goals of the unit.

Students in the experimental group responded anonymously to a questionnaire administered on the same day as the posttest (N = 206). The questionnaire consisted of a series of objective and open-ended questions. Sixty-one percent (125) were able to correctly list or describe four to five steps of the five-step problem solving approach. Of the students responding, 76.2% (151) indicated they had not used any parts of the approach anywhere, except during the instruction in class, at that time. Since the questionnaire was administered immediately after the conclusion of the instruction, it may be assumed that not enough time had been provided to allow students to practice the approach outside the classroom. Nevertheless, 63.6% of the students indicated that they intended to use at least part of the unit after they had left school.

Conclusions

Analyses of demographic variables collected from both the experimental and control groups indicated that the groups were equivalent on these variables as well as on the pretest score variable. Average pretest scores for the experimental and control groups differed regarding exposure to problem solving techniques. Since this variable did not correlate with gain scores, or posttest scores and was not a useful predictor of adjusted posttest scores when used in an analysis of covariance, it was dropped from further analysis.

An analysis of variance on pretest and posttest scores showed a statistically significant gain of the experimental group over the control

group. An analysis of covariance indicated the gain was stable. One-tailed t-tests showed the gain scores of the experimental group over the control group were statistically significant for 15 of the 17 test items which were developed from the behavioral objectives.

A measure of the numerical estimates of the magnitude of the effects of the GPA, pretest, and treatment variables examined, indicated the gain scores were of educational significance. Finally, a check for the interactive effects of the experimental/control, GPA, and pretest score variables indicated that the unit works equally well for students who have high or low GPAs.

In sum, the evidence supports the view that the instructional unit Coping in the World of Work: Practice in Problem Solving helps students become acquainted with a range of work entry and job adjustment problems and learn a systematic five-step approach to cope with these problems. Gains registered by the experimental group were substantial whereas essentially no gains were registered by the control group. Statistical tests of the differences in gains indicated that sampling error is an unlikely source of the differences. Further, analysis of variance and covariance provided evidence that the differences in gains cannot be attributed to differing composition of the experimental and control groups with regard to age, sex, father's occupation, father's education, mother's occupation, mother's education, type of school program, GPA, school activities, intentions after graduation, grade level, amount of part-time or full-time work experience, or the type of exposure to problem solving techniques. Finally, all instructors report positive experiences with the unit and its content. It is expected this unit will continue to make meaningful contributions to alleviating the school to work transition problems of youth in the future.

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